S. List Policy

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COORDINATING COMMITTEE

RECORD OF DISCUSSION

ON

ITEM 1545 - TRANSISTORS

2nd December, 1959

Present: Belgium (Luxembourg), Canada, France, Germany, Italy, Japan, Netherlands, United Kingdom, United States.

References: COCOM Documents Nos. 3700.1, 2 and 5, 3715.45/1, W.P.1545/1 - 7.

1. The CHAIRMAN invited the Committee's attention to the suggested amendments tabled by the United Kingdom Delegation in W.P.1545/6, supplementing the proposal submitted by the Netherlands Delegation in W.P.1545/5, which the Committee had agreed to study at the present meeting.

2. The UNITED KINGDOM Delegate stated that the primary aim of the proposal submitted by his Delegation was to include in Item 1545 the United States proposal concerning dendritic forms, for which the United States Delegation had suggested a special item (New Electronics Item No. 3). The Delegate pointed out that the amendment proposed by his authorities explained what should be understood by average frequency, which was taken into consideration in the United Kingdom, whereas maximum frequency was referred to in the Netherlands.

3. The GERMAN Delegate, referring to the first part of the United Kingdom proposal, stated that the inclusion of dendritic forms in Item 1545 might give rise to misunderstandings, and that, while not opposed to such an inclusion he considered that it would be preferable to leave dendritic forms in a separate item. The COMMITTEE agreed with this suggestion.

4. As to the second part of the United Kingdom amendment, which related to sub-items (c)(1), (c)(2) and (d) of the definition of Item 1545 set out in COCOM Document No. 3715.45/1, the NETHERLANDS Delegate stated that the changes suggested by the United Kingdom Delegation were very close to those proposed by the Netherlands Delegation except for the reference to average alpha frequency instead of minimum alpha frequency. His Delegation would therefore accept them. They would merely ask that in paragraph 3 of the Note proposed by the United Kingdom Delegation, the words "major production" should be substituted for the words "maximum production quantity". The COMMITTEE agreed with this proposal.

5. As the other Delegations could also accept the United Kingdom proposal (ad referendum however in the case of the United States), the CHAIRMAN stated that the definition of Item 1545, as accepted by the Committee would read as follows:

"Transistors and related devices (or related semi-conductor amplifying devices such as fieldistors, spacistors and technetrons) and specialised parts therefor, the following:
(a) Of any type using any semi-conductor material having 4 or more active junctions within any single block of semi-conductor material;
(b) Of any type using a bulk semi-conductor material other than germanium;
(c) Using germanium as the bulk semi-conductor material and having any of the following characteristics:
(1) an average f alpha less than 50 Mc/s and designed to have a maximum collector dissipation (in watts) times average f alpha (in Mc/s) greater than 7.5;

(2) an average f alpha of 50 to 150 Mc/s and designed to have a maximum collector dissipation greater than 150 mW;
(3) an average f alpha greater than 150 Mc/s;

(d) Specifically designed or rated for use as a swithhing transistor for switching rates (repetition frequency) greater than 500 Mc/s. This item will normally include switching type transistors with an average f alpha greater than 6 Mc/s.

NOTES: 1. A transistor is an electronic device incorporating a semi-conducting material, in which the current flowing between two electrodes is controlled by the voltage or current at another electrode. Subject to the above definition, this item is intended to cover all devices incorporating a semi-conducting crystal of any material with three or more electrical connections or with only two such connections where 4 or more active junctions exist within a single bloc of semi-conductor material, which are used as amplifiers, oscillators, trigger devices, etc., or combinations thereof in electronic circuits. For transistors see Item 1548.

2. The maximum collector dissipation is to be defined as the continuous dissipation measured at an ambient temperature of 25°C. and under any cooling conditions.

3. The average f alpha is defined as the f alpha at which the major production of a particular type of transistor occurs.

Where the average f alpha is not quoted or known, this value shall be taken as 1.5 times the maximum f alpha.

4. f alpha is defined as the frequency at which the modulus of the current gain in the common base connection has decreased to 0.707 of its low frequency value.

5. Where f_1 (the frequency at which the modulus of the current gain in the common emitter connection is equal to 1) is quoted instead of f alpha, f_1 may be regarded as 1.2 times f alpha.

6. The CHAIRMAN drew the Committee's attention to the fact that the text of sub-item (c) which appears above had been changed (see W.P.1545/7) at the request of the French Delegate, who had noted that the original text included an arithmetic impossibility. After the French, Netherlands and United States Delegations had confirmed that the changes did not affect the coverage of the sub-item concerned, the German and United Kingdom Delegates, who had had reserves as to the propriety of altering a text already approved unanimously by the Committee, stated that they could accept the new wording of sub-item (c) as shown above.

CONCLUSION: On the 14th December, the United States Delegate having given final agreement to the text of the new definition, the COMMITTEE agreed to adopt the redefinition of Item 1545 set out in paragraph 5 above.